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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/749,293

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Xintian E. Lin

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EXAMINER

NGO, NGUYEN HOANG

ART UNIT

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2416

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/749,293	Applicant(s) LIN ET AL.	
	Examiner NGUYEN NGO	Art Unit 2416	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 February 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9, 26 and 27 is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9, 26 and 27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

This communication is in response to the RCE of 2/17/2009. All changes made to the Claims have been entered. Accordingly, Claims 1-9, and 26-27 are currently pending in the application.

Claim Objections

1. Claim 26 is objected to because of the following informalities:
2. Claim 26 states "transmit on s each of M spatial channels". Examiner believes this to be a typo.
3. Appropriate correction is required.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
3. Claims 1-3, 7-9, and 26-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Alastalo et al. (US 2001/0047424), in view of Raghothaman et al. (US 20050111376), hereinafter referred to as Alastalo and Raghothaman.

Regarding claim 1, Alastalo discloses a device, comprising:

a scheduler (access point scheduler for performing various timing operations, page 2 [0021]) in an access point to schedule variable length packets (the lengths of the time slots are not necessary the same, because the quantity of information to be transmitted is not necessarily the same, page 6 [0052] and page 7 [0058] and figure 7) for transmission based on transmission times to transmit on spatial channels to mobile stations (access points broadcasts general information on the current frame, e.g. on uplink and downlink time slots assigned for terminals MT1-MT4, page 2 [0021]-[0022] and page 3 [0030] and abstract).

Alastalo however fails to specifically disclose the amended limitation to transmit on each of M spatial channels by filling M spatial channels for traffic for traffic on M stations at a time instant, where M is a constant less than or equal to a number of antennas at the access point. Alastalo however discloses that as the access point applies SDMA for example to M different terminals, the spatial signatures of the terminals are modified (page 3 [0030]) and that the access point uses a number of antenna elements, N (page 3 [0025] and page 1 [0025]). Applicant further submits (see

specification, page 4 lines 5-10) that conventional SDMA systems have the access point fill the M channels only using packets buffered for M stations (filling M spatial channels for traffic on M stations at a time instant). It would have therefore been obvious that Alastalo uses such a conventional SDMA system to fill M spatial channels for traffic on M stations at a time instant, since this technique is obviously well known in the art. Raghothaman further discloses that for a system utilizing antennas, the MIMO channel may be considered as a number of C independent channels, where C is less than or equal to the number of antennas and that each of the C channels is also referred to as a spatial subchannel (C corresponding to M spatial channels) of the overall MIMO channel (where M is a constant less than or equal to a number of antennas at the access point, page 1 [0003]). It would have thus been obvious to a person skilled in the art at the time the invention was made to incorporate the concept of having M be a constant less than or equal to a number of antennas at the access point as disclosed by Raghothamam, into method for arranging communication between terminals and an access point as disclosed by Alastalo, in order to efficiently and correctly arrange communications between an access point and a number of mobile stations.

Regarding claim 2, Alastalo discloses the device of claim 1 further including adaptive antenna arrays used in conjunction with a beam forming algorithm to achieve spatial diversity and implement Spatial-Division Multiple-Access (SDMA), wherein the adaptive antenna array changes beam weights based on the schedule (access point applies

SDMA for simultaneous transmission to M different terminals, page 1 [0002] and page 3 [0030]-[0036]).

Regarding claim 3, Alastalo discloses the device of claim 1 wherein the scheduler in the downlink provides the schedule of transmission intervals for different mobile stations (M different terminals, page 3 [0030] and abstract).

Regarding claim 4, Alastalo discloses the device of claim 1 wherein the schedule accounts for traffic information based on packet size (page 7 [0058]).

Regarding claim 7, 8, Alastalo discloses the device of claim 1 wherein the access point sends multiple schedules in a protected time interval to the mobile stations (method for arranging communication between terminals and an access point in a communication system applying data transmission frames which comprises downlink time slots for performing data transmission from the AP to the terminals, page 7 [0061]-[0062] and page 8 claim 1).

Regarding claim 9, Alastalo discloses the device of claim 1 wherein the access point fills spatial channels using the data packets buffered for all the mobile stations (transmission data buffers, page 7 [0060]).

Regarding claim 26, Alastalo discloses a method for a Medium Access Control (MAC) protocol (MAC frame, page 2 [0012]), comprising:

scheduling variable length packets (the lengths of the time slots are not necessary the same, because the quantity of information to be transmitted is not necessarily the same, page 6 [0052] and page 7 [0058] and figure 7) for transmission in an access point based on transmission times to transmit on spatial channels to mobile stations (access points broadcasts general information on the current frame, e.g. on uplink and downlink time slots assigned for terminals MT1-MT4, page 2 [0021]-[0022] and page 3 [0030] and abstract).

Alastalo however fails to specifically disclose the amended limitation to transmit on each of M spatial channels by filling the M spatial channels for traffic for traffic on M stations at a time instant, where M is a constant less than or equal to a number of antennas at the access point. Alastalo however discloses that as the access point applies SDMA for example to M different terminals, the spatial signatures of the terminals are modified (page 3 [0030]) and that the access point uses a number of antenna elements, N (page 3 [0025] and page 1[0025]). Applicant further submits (see specification, page 4 lines 5-10) that conventional SDMA systems have the access point fill the M channels only using packets buffered for M stations (filling M spatial channels for traffic on M stations at a time instant). It would have therefore been obvious that Alastalo uses such a conventional SDMA system to fill M spatial channels for traffic on M stations at a time instant, since this technique is obviously well known in the art.

Raghothaman further discloses that for a system utilizing antennas, the MIMO channel may be considered as a number of C independent channels, where C is less than or equal to the number of antennas and that each of the C channels is also referred to as a spatial subchannel (C corresponding to M spatial channels) of the overall MIMO channel (where M is a constant less than or equal to a number of antennas at the access point, page 1 [0003]). It would have thus been obvious to a person skilled in the art at the time the invention was made to incorporate the concept of having M be a constant less than or equal to a number of antennas at the access point as disclosed by Raghothamam, into method for arranging communication between terminals and an access point as disclosed by Alastalo, in order to efficiently and correctly arrange communications between an access point and a number of mobile stations.

Regarding claim 27, Alastalo discloses the method of claim 26, further including: retrieving antenna resources in the access point to form spatial channels developed on the fly for a waiting mobile station (access point applies SDMA, page 3 [0030]-[0036]).

4. Claim 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Alastalo et al. (US 2001/0047424), in view of Raghothaman et al. (US 20050111376), in view of Niwano (US 20070081498), hereinafter referred to as Alastalo, Raghothaman, and Niwano.

5. **Regarding claim 5, and 6**, Alastalo and Raghothaman fails to specifically disclose wherein the schedule accounts for traffic information to the mobile stations based on queue size/and priority. However it is well known in the art to base transmission schedules on such traffic information as queue size/and priority. Niwano discloses of such a concept as Niwano discloses of a base station and scheduler in which determines a schedule of a transmission timing at which the base station transmit packet data to mobile stations based on queue size and priority (page 3 [0049]). It would have thus been obvious to have the schedule account for traffic information as disclosed by Niwano into the method and system for arranging communications between terminals and an access point as disclosed by the combination of Alastalo and Raghothaman, in order to efficiently and correctly transmit and schedule data transmissions from an access point to a terminal.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to NGUYEN NGO whose telephone number is (571)272-8398. The examiner can normally be reached on Monday-Friday 7am - 3:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kwang Yao can be reached on (571)272-3182. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Kwang B. Yao/
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